SWATI SHARMA

Field of research:

Nonlinear Effects and Turbulence in Space Plasmas

Name of institute:

Indian Institute of Technology Delhi, India

Pursuing degree:

PhD

Completed degree (in descending order):

- Masters in Science (MSc. Physics, 2011) from Hansraj College, University of Delhi (India) with Ist division. Specialization taken up: Electronics and Non-Linear Dynamics (secured 69%)
- Bachelors in Science (BSc. Physics, 2009) from Gargi College, University of Delhi (India) with distinction (secured 80%)
- Senior School Certificate Examination (12th std, 2006) & Secondary School Examination (10th std, 2004) from Kendriya Vidyalaya I.N.A ,Delhi under Central Board of Secondary Education (CBSE) with distinction.

Workshop (in descending order):

- CCMC Spaceweather Concepts and Tools. (2016)
- Attended SERB school on 'High Intensity Laser Plasma Interaction: Theory & Simulation' in 2014 conducted by 'Science and Engineering Research Board', DST, India held at IIT Delhi.
- Participated in the Structured Symposium on Advanced Research in Physical Science organized at National Physics Laboratory, New Delhi, India from 26th may to 6th June 2008 and participated in the scientific program.

Poster presentations (in descending order):

- Participated and presented a poster titled 'Circularly Polarized Dispersive Alfven Wave and Its Role in Solar Wind Turbulence at 1 A.U' in 'Coupling and Dynamics of the Solar Atmosphere' held in Pune, India. (2014)
- Participated and presented a poster titled 'Solar Wind Turbulence and the Role of circularly Polarized Dispersive Alfvén Wave' in 'Joint ICTP-IAEA College on Advanced Plasma Physics' held in Trieste, Italy. (2014)
- Presented a poster titled 'Fusion Energy and Turbulence in Magnetized plasmas' on Open House 2014 in IIT Delhi.

Publications (in descending order):

1. **Swati Sharma**, R. P. Sharma, and Nidhi Gaur, "Temporal Evolution of Circularly Polarized Dispersive Alfvén Wave and Effect on Solar Wind Turbulence", Astrophy. & Space Sc. doi:10.1007/s10509-015-2619-6 (2016)
2. Rajesh Kumar Rai, **Swati Sharma**, N.Yadav, M.L. Goldstein and R. P. Sharma, "Effect of magnetic islands on the localization of kinetic Alfvén wave", Phys. Plasmas, 22, 122106 (2015)
3. R. P. Sharma, **Swati Sharma**, and Nidhi Gaur, "Right-handed Circularly Polarized Dispersive Alfvén Wave: Localization and Turbulence in Solar Wind " J. Geophys. Res. 120, (2015)
4. R. P. Sharma, P.P Tiwari, K.V.Modi, R.K. Singh, **Swati Sharma** and V.R.Satsangi, "Spatio temporal evolution of magnetosonic wave in laser plasma interaction", Phys. Plasmas, 22,052307, (2015)
5. R. P. Sharma, **Swati Sharma** and Nidhi Gaur, "Nonlinear coupling of left and right handed circularly polarized dispersive Alfvén wave", Phys. Plasmas, 21, 072307,(2014)
6. **Swati Sharma**, R. P. Sharma, and Nidhi Gaur, 'Localization of Circularly Polarized Dispersive AlfvénWave and Effect on Solar Wind Turbulence', J. Geophys. Res.,119, 1435-1441 (2014)

Purpose of study in the research field (in 1000 words):

The field of my research work is the study of nonlinear phenomena encountered in the astrophysical plasmas mainly the solar wind plasmas. Waves and instabilities are considered to be one of the important mechanisms responsible for the acceleration of the particle and the solar wind turbulence. Solar wind turbulence at large inertial scales is well known for decades and believed to consist of Alfvén cascade. The inertial range of Solar wind turbulence can be described by a magnetohydrodynamic model. But at small scales the MHD description is not valid. At scales of the order of proton inertial length, Alfvén cascade excites kinetic Alfvén wave or fast wave or whistler wave that carries wave energy to smaller scales. On the other hand,

parallel propagating right(R) and left(L) circularly polarized Alfvén/ ion cyclotron wave in the framework of Hall MHD are also thought to be essential ingredients of the solar wind turbulence. The present work intend to study the right circularly polarized dispersive Alfvén wave (DAW) and their role in the solar wind turbulence. The inclusion of the Hall term causes the dispersion of the AW which, in the present study, is considered on account of the finite frequency (frequency comparable to ion gyro frequency) of the pump wave. Filamentation instability has been reported to occur for the case of circularly polarized dispersive Alfvén wave (DAW) propagating parallel to ambient magnetic field. In the present study, the instability arises on account of the transverse density perturbations of the acoustic wave that may couple nonlinearly with the Alfvén wave and the driven ponderomotive force sequentially leads to growth of density perturbations. Numerical simulation involves finite difference method for the time domain and pseudo spectral method for the spatial domain. The power spectrum is investigated which shows a steepening for scales larger than the proton inertial length. These findings have been reported by CLUSTER spacecraft.

Other details:

Awards & Honour (i.e.NET/SLAT/JEST/GATE/Any equivalent):

GATE

Any other examinations (i.e. IELTS/TOFEL/ any equivalent)

NIL

Computer Operating and/or Programming Skill:

- Programming Languages: C++, C, Pascal, FORTRAN, Matlab
- MS Office, Linux

Language Skill

Hindi, English

Permanent communication address:

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Swati is a senior research scholar pursuing PhD from Indian institute of Technology Delhi, India. The area of her research work is to study the various nonlinear phenomena taking place in solar atmospheres.

She participated in the Science for Space Weather School organized by CCMC/NASA held in Goa, India 2016. During this school she was trained to work on the CCMC runs using iSWA and other analysis tools. She studied the occurrence of many solar phenomena and analyzed solar events in the past and in real-time using these tools.

Through this experience, she has gained essential experience to accurately analyze space weather events and recognize their occurrence and effects.

She can implement these tools to extend her studied for a quantitative assessment of space environments. Swati has also assisted in teaching international guests and undergraduate/high school interns about forecasting and researching space weather phenomena.